

Fig. 1
(prior Art)

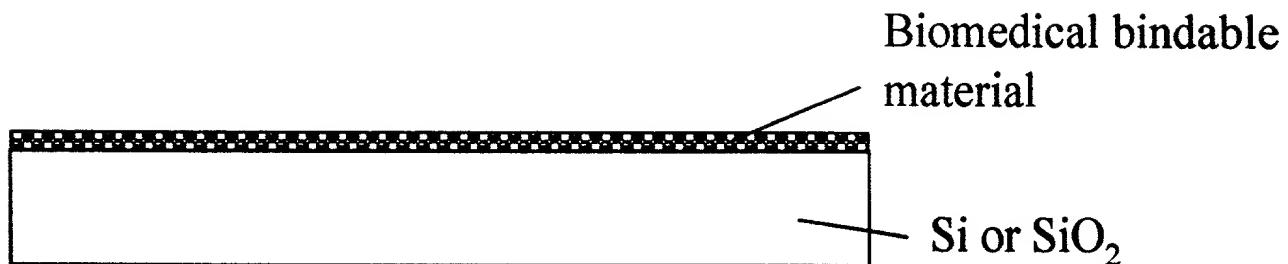


Fig. 2A-1 (prior Art)

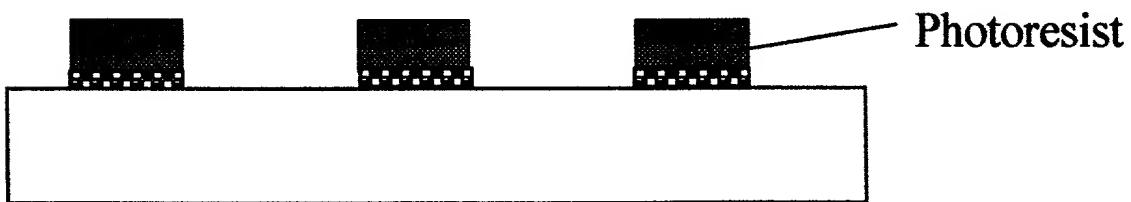


Fig. 2A-2 (prior Art)

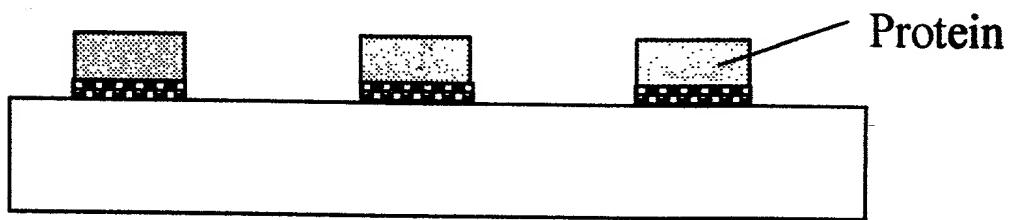


Fig. 2A-3 (prior Art)

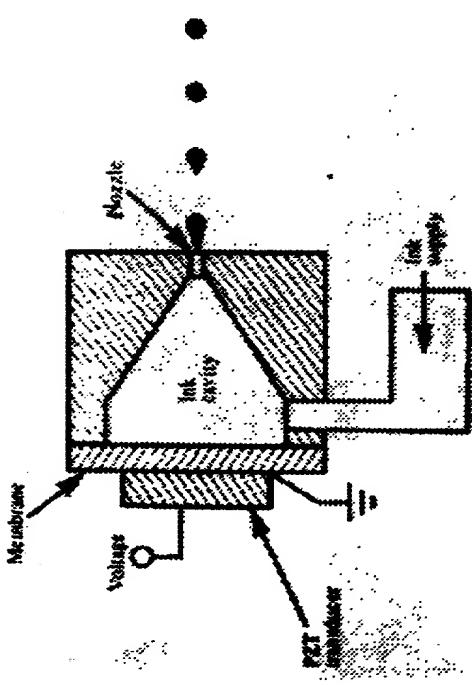


Fig. 2B-1 (prior Art)

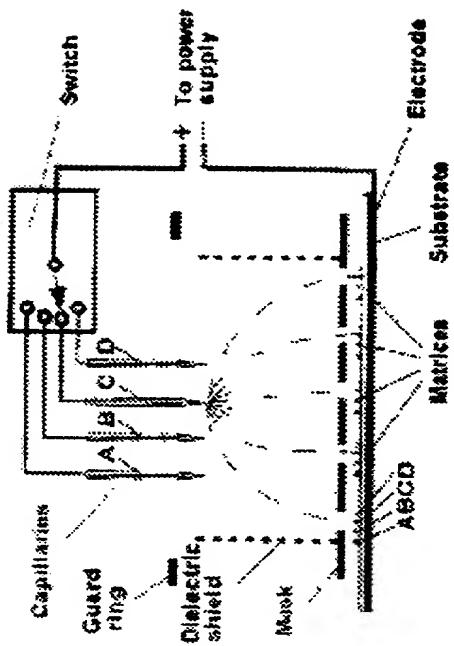


Fig. 2B-3 (prior Art)

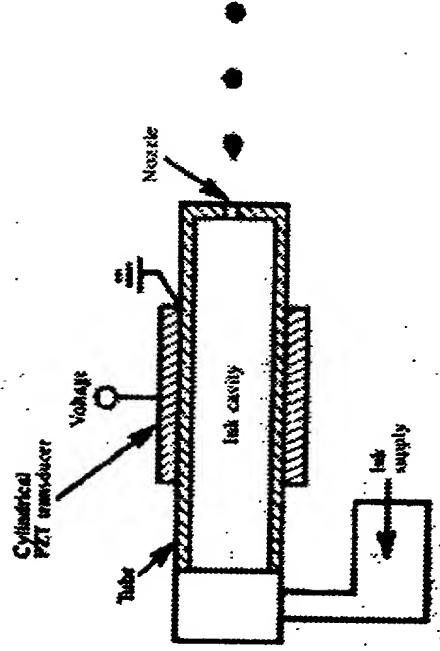


Fig. 2B-2 (prior Art)

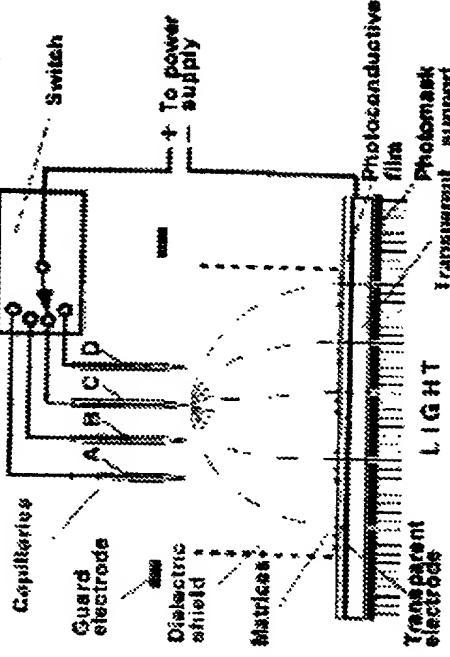


Fig. 2B-4 (prior Art)

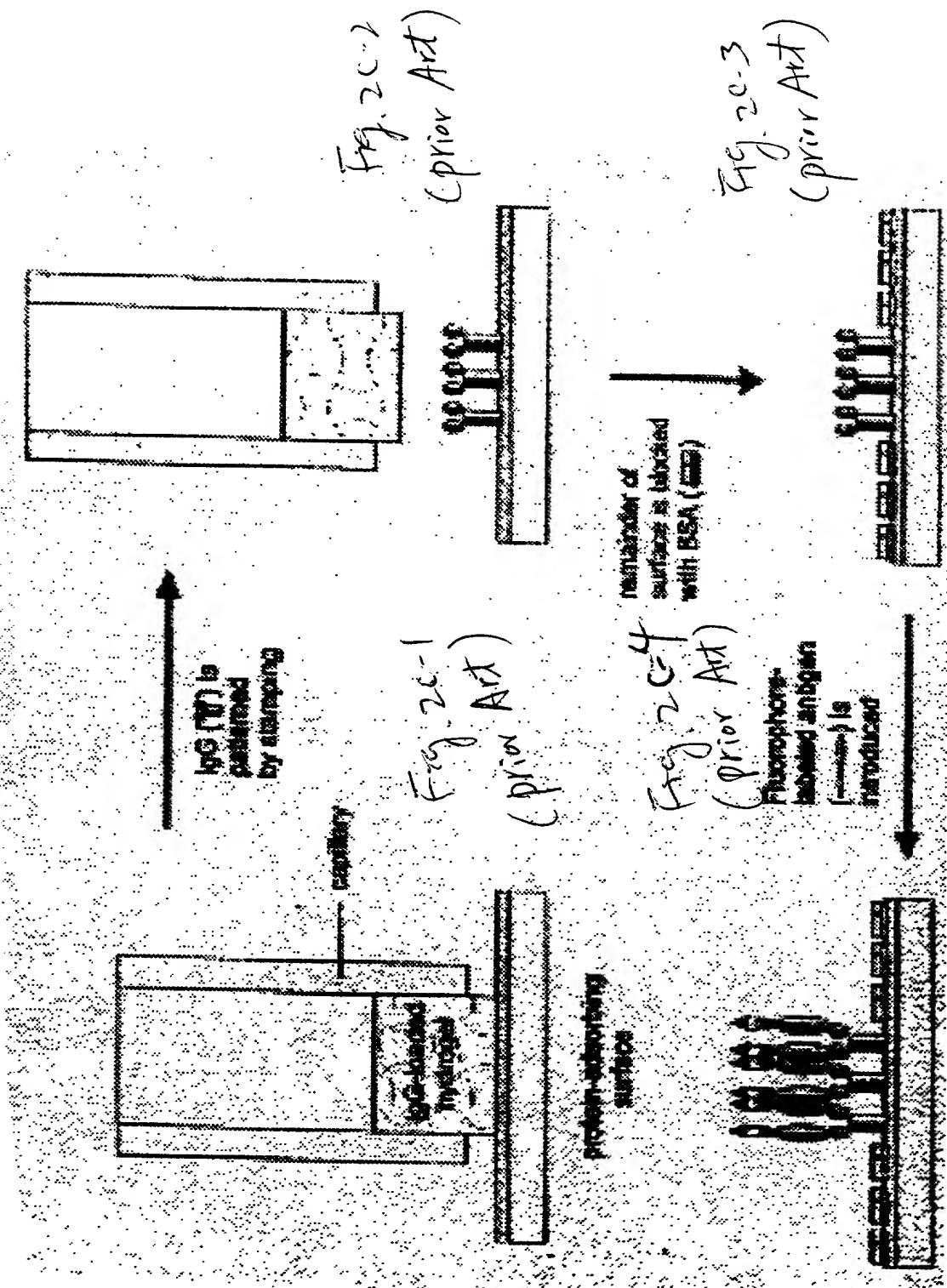


Fig. 2D-a (prior Art)
One type protein

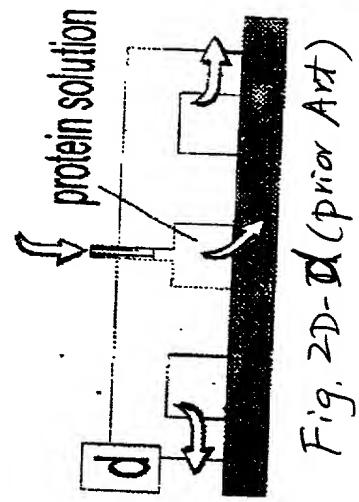
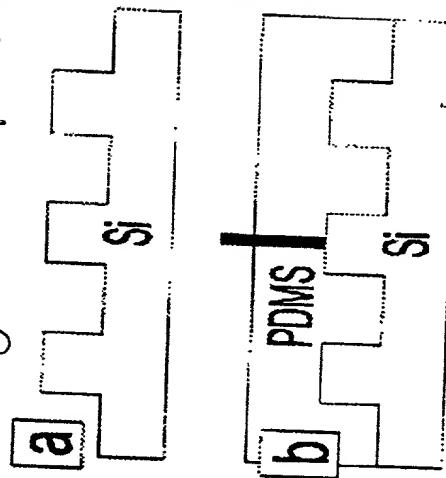


Fig. 2D-d (prior Art)

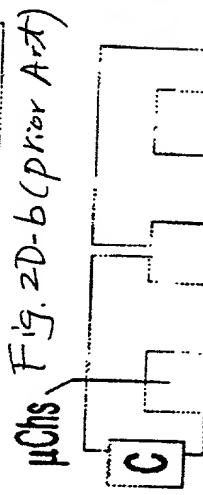


Fig. 2D-b (prior Art)

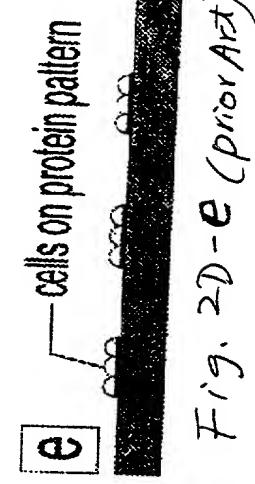


Fig. 2D-c (prior Art)

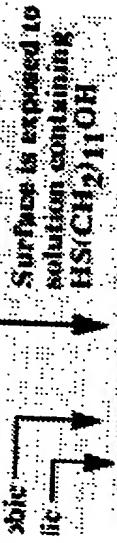


Fig. 2E-1 (prior Art)

Fig. 2E-2 (prior Art)

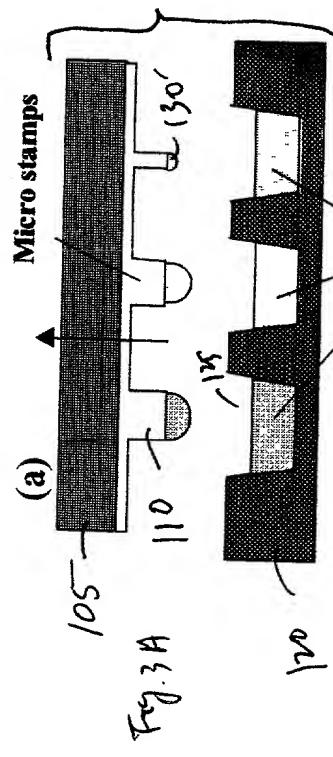


Fig. 2E-3 (prior Art)

Fig. 2E-4 (prior Art)



Fig. 2E-5 (prior Art)



Protein solutions (30)

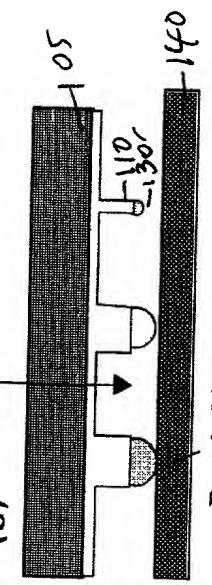
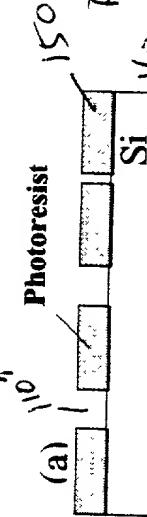
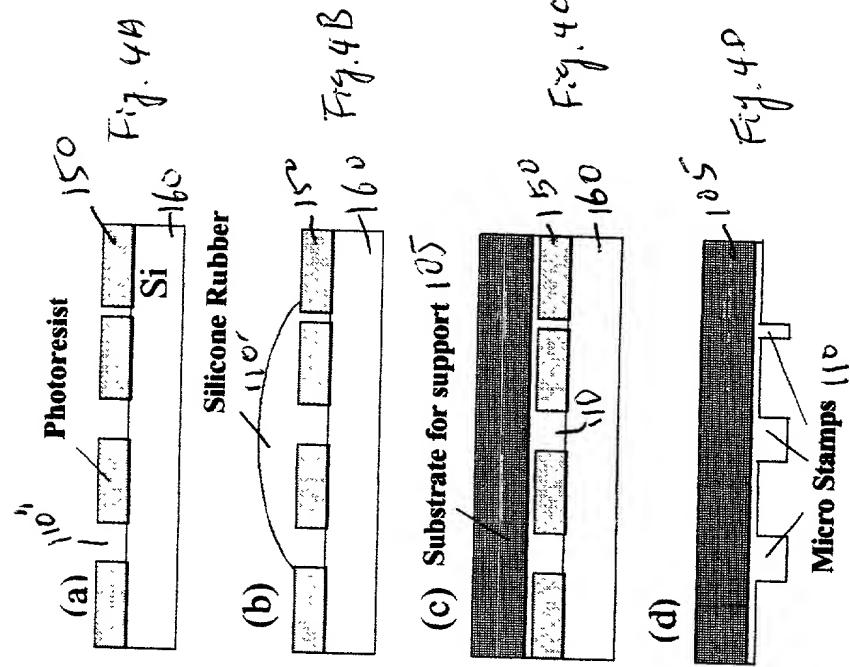


Fig. 3B

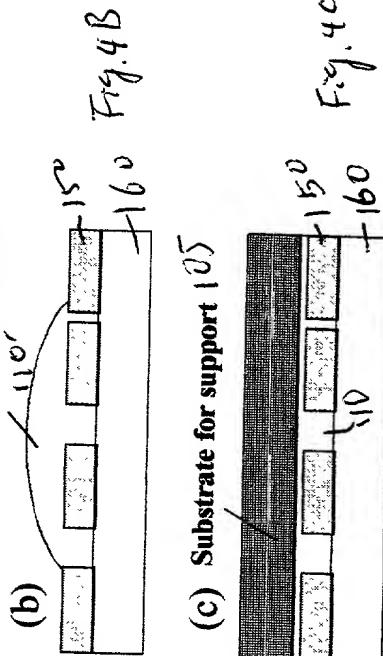
Protein binding substrate



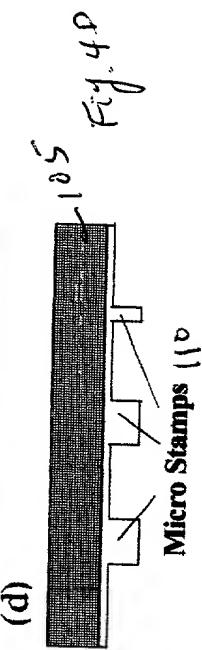
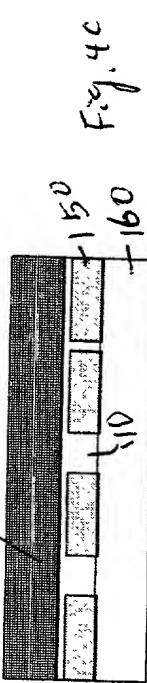
Fig. 3C



Silicone Rubber



Substrate for support 105



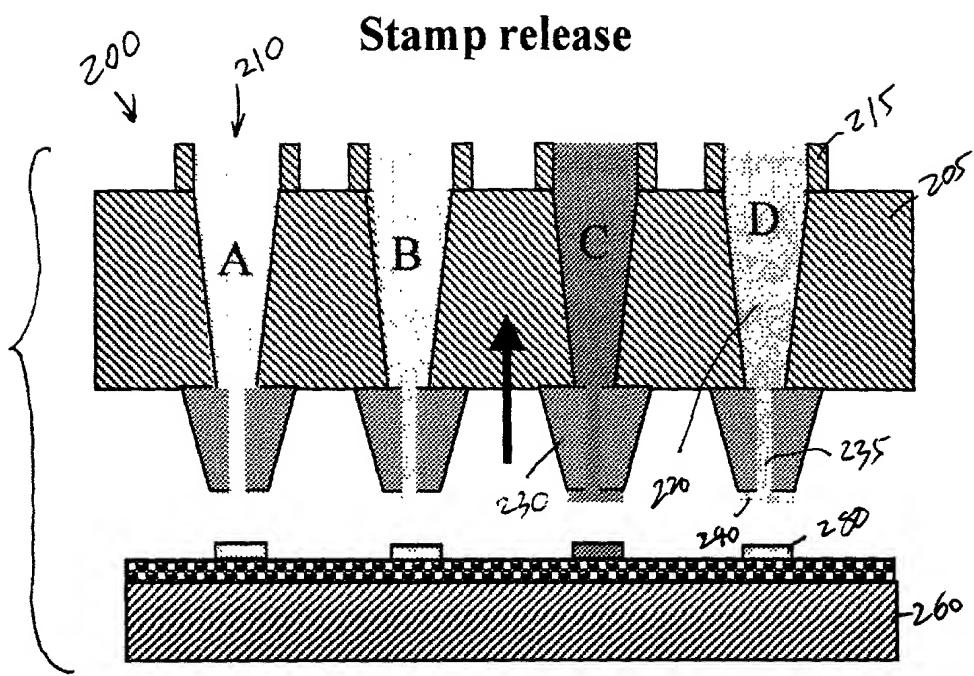


Fig. 5

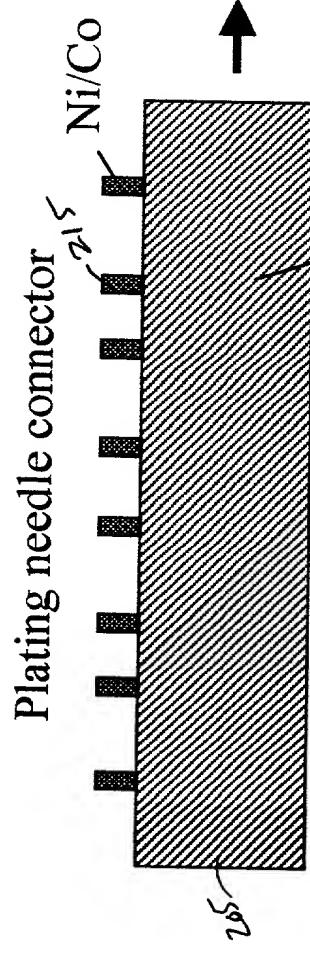


Fig. 6A

Remove silicone rubber residue
to open channel/stamp connection

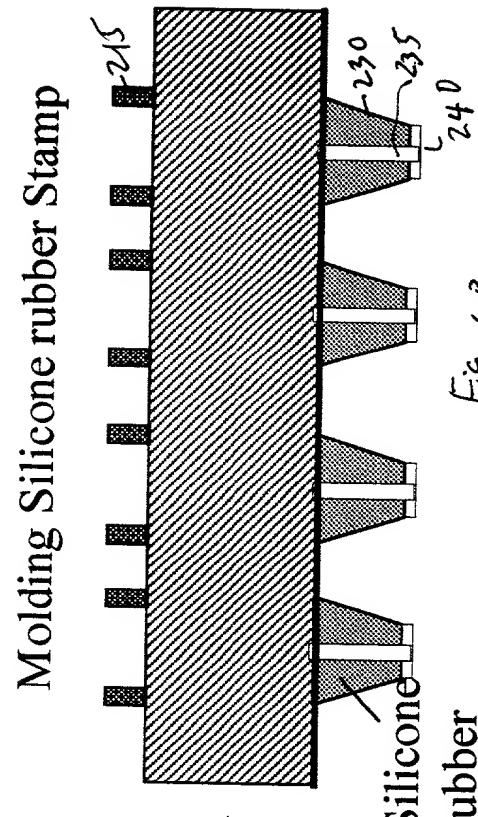


Fig. 6B

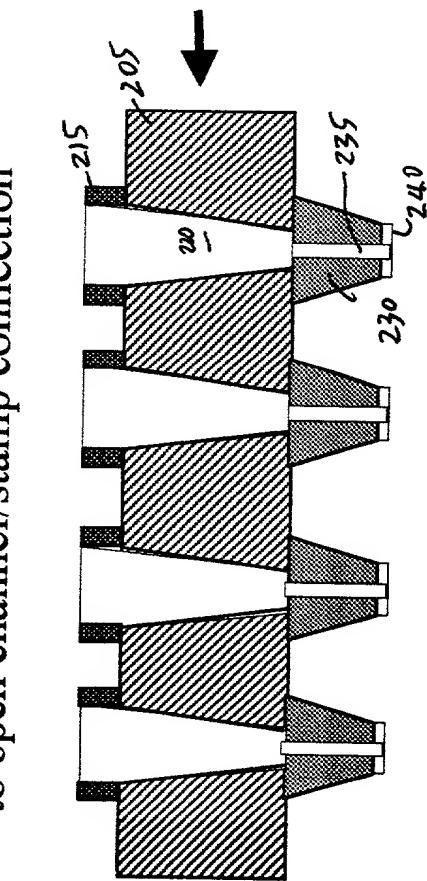


Fig. 6D

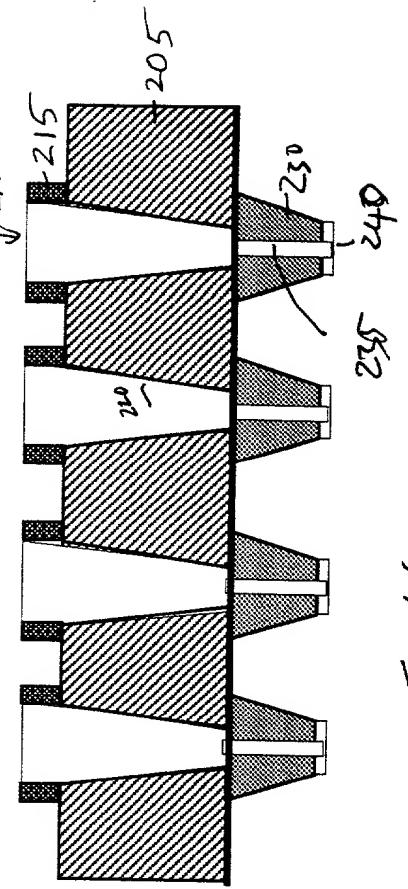
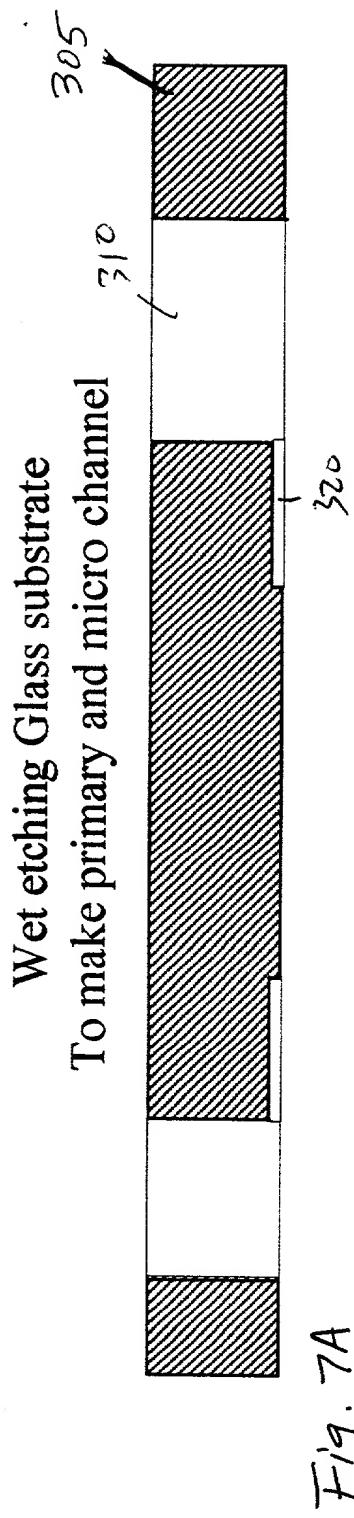
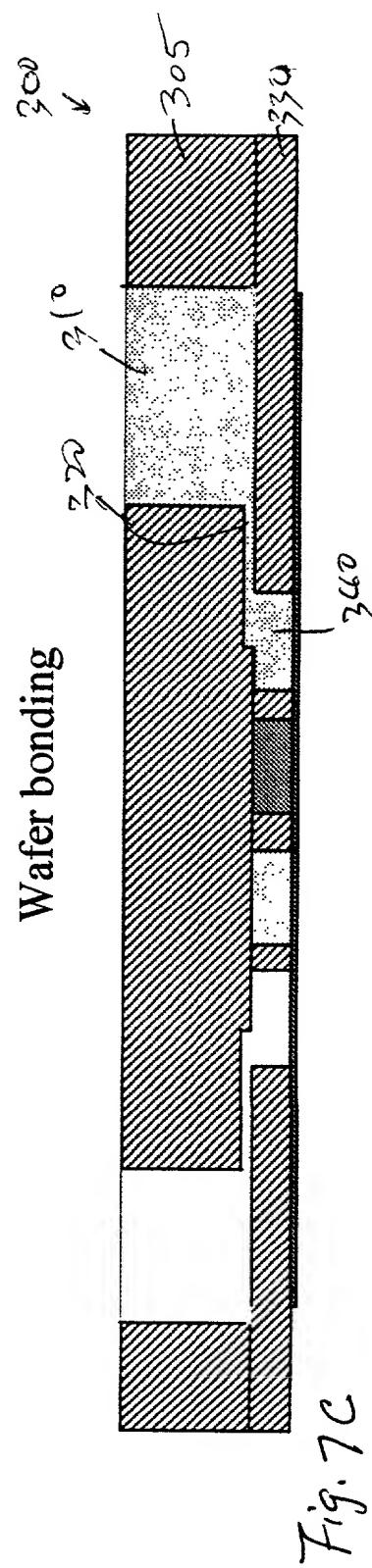
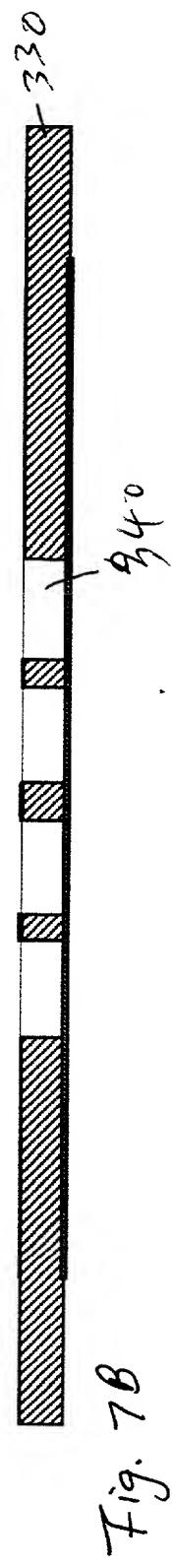


Fig. 6C



Silicone rubber molding silicon substrate
Deep RIE secondary reservoir



bio gel, PTFE, PVDF, Niton, etc.

Electrode, sensor, heater 310

Fig 8A

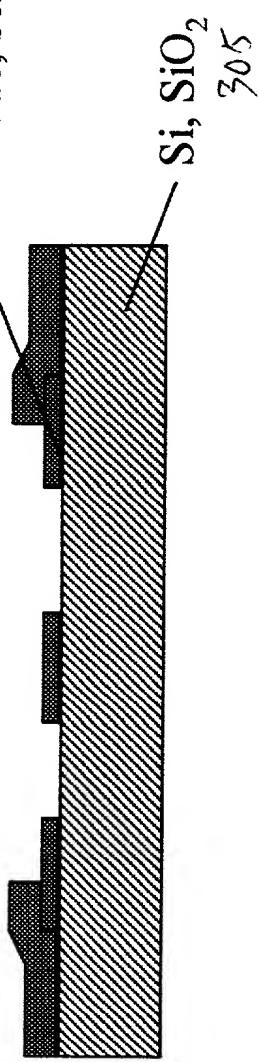
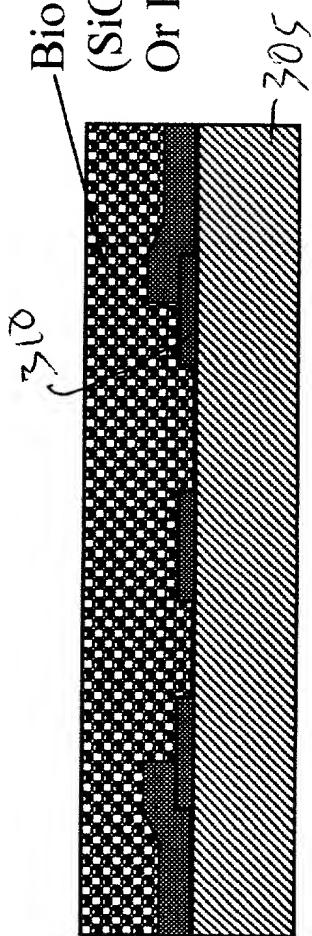


Fig 8B

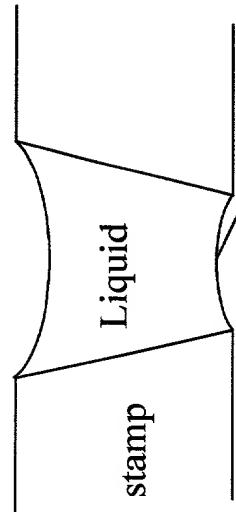
Bio bindable material
(SiO₂, PVDF, Niton..)
Or Bio gel. 320



New design concepts

A. Liquid filling into stamp

(1) hydrophilic surface inside channel (easy to fill in, but the bottom meniscus of liquid is concave upward which is not desired)



Not easy to contact with reaction substrate

Fig. 9A

(3) hybrid surface inside channel

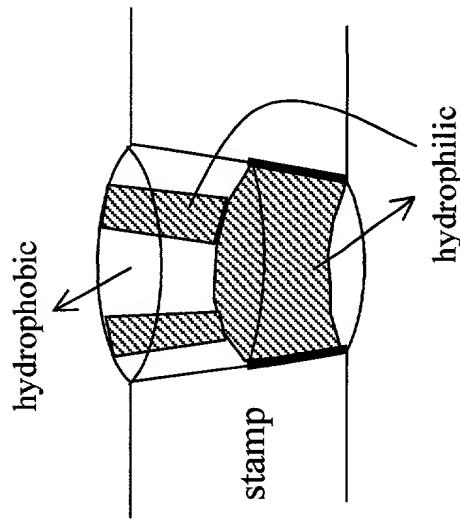
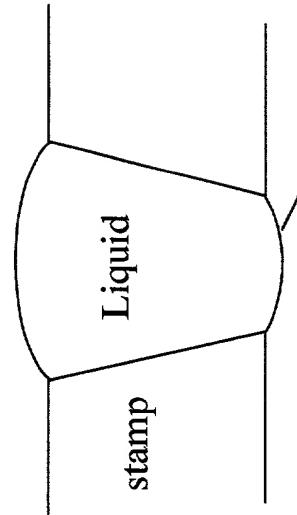


Fig. 9C

(2) hydrophobic surface inside channel (liquid hard to fill in, however, the bottom meniscus of liquid is what we need; concave downward)



Easy to contact with reaction substrate

Fig. 9B

partial hydrophilic and hydrophobic surface as the left side; or the surface can be switched into hydrophilic or hydrophobic as desired

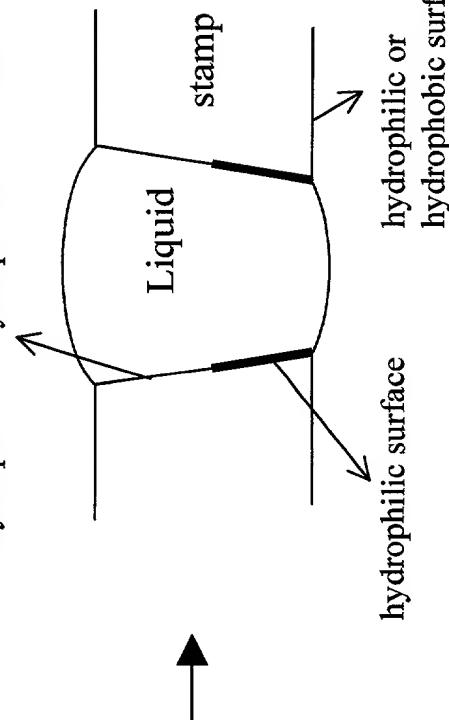
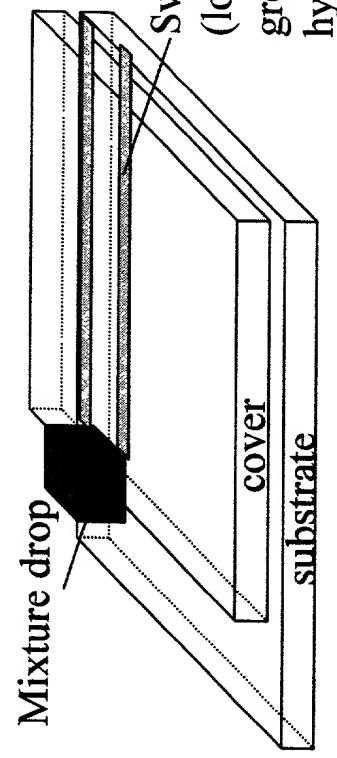


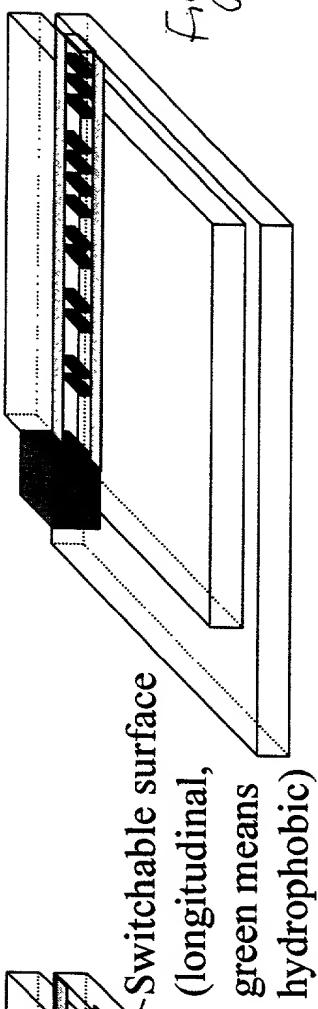
Fig. 9D

New idea: 2 D micro Separation

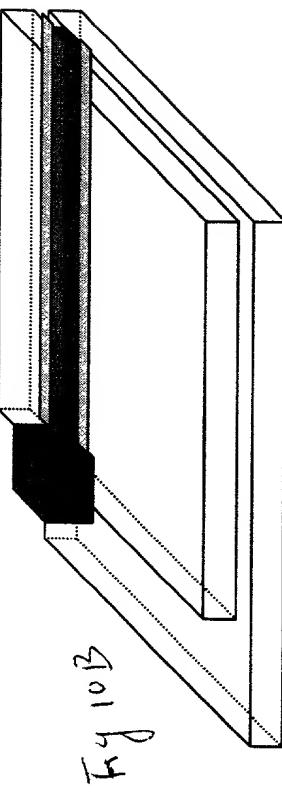
(a) Blood or bio-reagent mixture drop



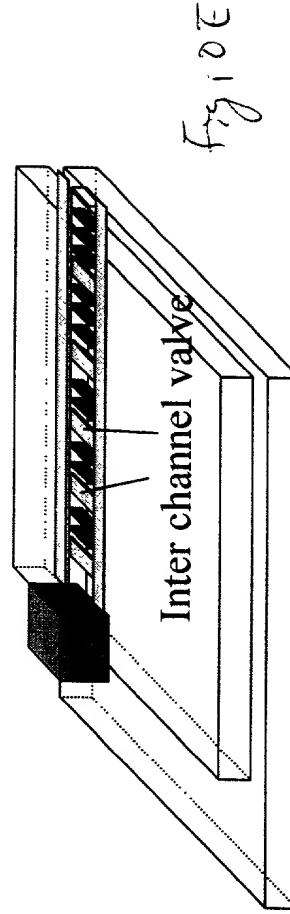
(d) Proteins, DNA... coarse separation by capillary electrophoresis



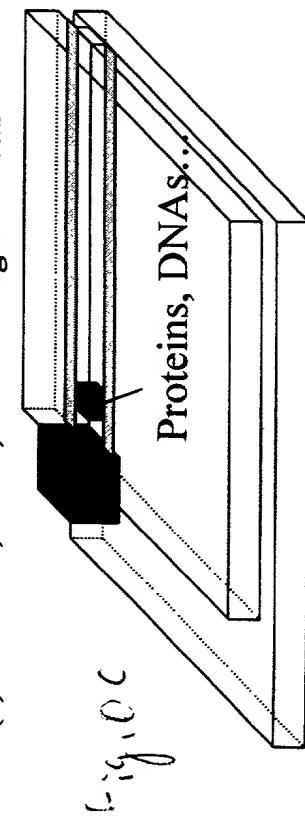
(b) Liquid mixture fill in by surface tension



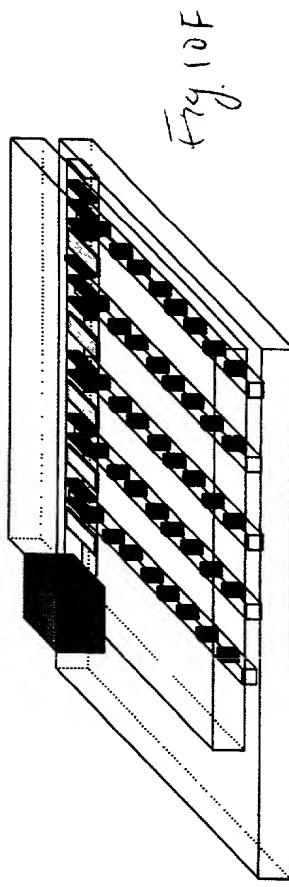
(e) Mixture droplet separation



(c) Proteins, DNA, or bio-reagent focus



(f) Liquid fill into vertical channels and Fine separation by capillary electrophoresis



**Micro protein arrays
on chip surface**

**(a). Dry off and take
out the cover**

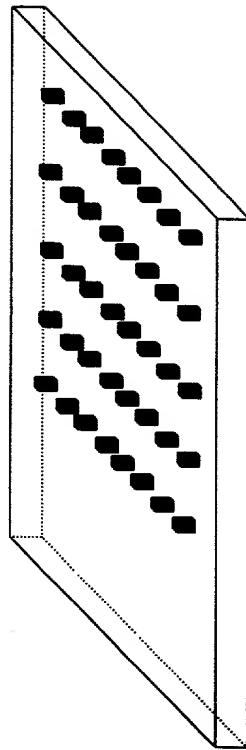


Fig 11 B

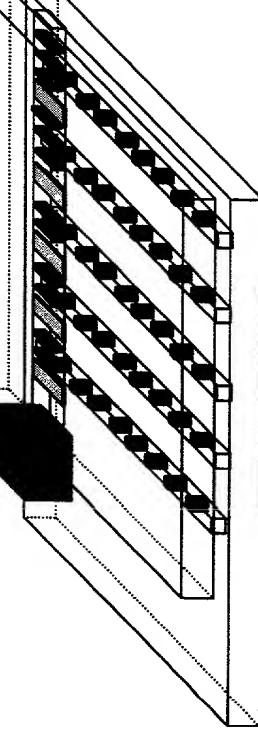
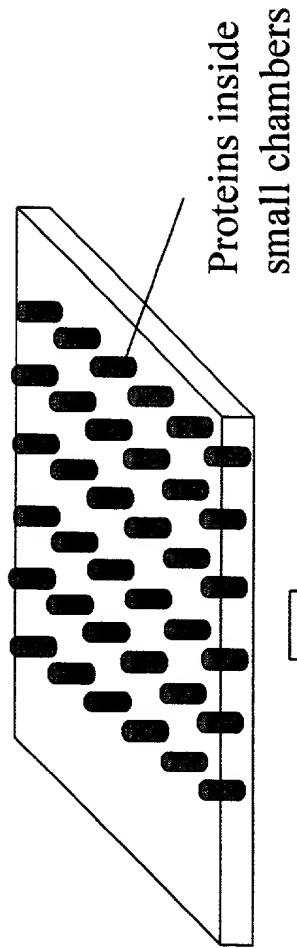


Fig 11 A

**Micro protein arrays
inside micro chambers**

**(b). Suck into
micro chambers**



Proteins inside
small chambers

**Directly connected to micro stamp
for microfilling process
(pitch is exactly the same as on the stamp)**

Fig 11 C



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